

**Math 3C Fall 2014**

**Pre-lecture 6-1 Due: Beginning of lecture-Monday, November 10.**

This is to be done on your own paper. Please write your name (last name first) on the top right corner along with your discussion section number (B02, B03 etc) and “pre-lecture [number]” (in this case “pre-lecture 6-1”).

This will be graded on effort and thoughtfulness, not on correctness. With that said, do not feel obligated to write more than necessary. This is intended for you to work on your own.

This assignment will require you to use a calculator (or find one on your computer or on the internet) Recall the formula for compounding interest. It is

$$A(t) = P \left( 1 + \frac{r}{n} \right)^{nt}$$

where  $P$  is the initial amount,  $r$  is the annual interest rate,  $n$  is the number of times interest is compounded per year, and  $t$  is the time in years.

1. Suppose you invest \$1 for 10 years at an annual interest rate of 5%. (So  $P = 1$ ,  $r = .05$ , and  $t = 10$ )
  - (a) How much money would your \$1 turn into if interest is compounded once a year? (in other words  $n = 1$ )
  - (b) How much money would your \$1 turn into if interest is compounded quarterly? (in other words  $n = 4$ )
  - (c) How much money would your \$1 turn into if interest is compounded monthly?
  - (d) How much money would your \$1 turn into if interest is compounded daily (assume for simplicity that each year has 365 days for this question and for the rest of the questions on the pre-lecture)
  - (e) How much money would your \$1 turn into if interest is compounded hourly (you'll have to figure out how many hours are in a year- try to do it yourself, don't just google the answer)
  - (f) How much money would your \$1 turn into if interest is compounded minutely (again, try not to google)
  - (g) How about if it is compounded every second?
  - (h) What do you notice about the amounts? Are they changing? Are they changing by a constant amount or are they trending toward a number?
2. We can guess that there is some formula to give what this value is trending toward. It is exponential growth so we “guess” that it has the form

$$f(t) = B^{rt}.$$

- (a) If this is right, we should have

$$[\text{your answer from 1. (h)}] \approx f(10) = B^{(.05)(10)} = B^{\frac{1}{2}}.$$

So we set up the equation:

$$[\text{your answer from 1. (h)}] = B^{\frac{1}{2}}$$

Solve this for  $B$ . (your answer is a number)

- (b) Does this number look familiar? (hint: it probably should)